

IN THE DRAWINGS

Applicant submits two replacement sheets substituting amended drawings for Figures 1, 2, and 4.

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REMARKS

Applicant has amended Claims 1, 5, 17, 22-23, and 25 and cancelled Claim 12. Therefore, upon entry of this amendment, Claims 1-11 and 13-25 are pending. Applicant respectfully requests reconsideration and reexamination of the application.

Claims 1-25 were provisionally rejected under obviousness type double patenting with respect to claims 1-17 of copending Application No. 10/863,866. A first Terminal Disclaimer is included herewith disclaiming the terminal part of the statutory term of a patent granted based on the present application that may extend beyond the expiration date of any patent granted on a pending reference application number 10/863,866. Therefore, Applicant respectfully requests the provisional double patenting rejection be withdrawn.

Claims 1-25 were rejected under obviousness type double patenting with respect to U.S. Patent No. 6,829,072. A second Terminal Disclaimer is included herewith disclaiming the terminal part of the statutory term of a patent granted based on the present application that may extend beyond the expiration date of U.S. Patent No. 6,829,072. Therefore, Applicant respectfully requests the double patenting rejection be withdrawn.

The drawings were objected to under 37 CFR 1.84(p)(5) for including reference characters not mentioned in the description, listing reference numbers 40 and 42 in Figure 1,

reference number 49 in Figure 2, and reference number 56 in Figure 4. Replacement drawing sheets for Figures 1 and 2 and 4 are submitted herewith addressing the objection, wherein reference numbers 40 and 42 in Figure 1 are removed, reference number 49 in Figure 2 is changed to reference number 44, and reference number 56 in Figure 4 is changed to reference number 58. Applicant respectfully requests the drawing objection be withdrawn.

The drawings were objected to under 37 CFR 1.84(p)(5) for not including reference characters mentioned in the description, listing reference number 58 in specification paragraph [0029]. Applicant respectfully traverses this objection since reference number 58 is shown on Figures 2, 3 and 5 between elements 50 and 10, and on Figure 4 (as amended). Applicant respectfully requests the drawing objection be withdrawn.

The drawings were objected to under 37 CFR 1.84(p)(4) for designating different parts with the same reference numbers 40, 42, and 56. The multiple designations for these reference numbers are corrected in the replacement drawing sheets referenced above. Applicant respectfully requests the drawing objection be withdrawn.

Claims 5, 17, 22, 23, and 25 were objected to because of informalities. Claims 5 and 17 are amended to recite "photorefractive". Claim 22 is amended to recite "photons

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from the first photon source". Claim 23 is amended to recite "biasing". Claims 23 and 25 are amended to recite "the photodiode". Claim 25 is amended to recite "a first wavelength of light" and "the first wavelength of light". Applicant respectfully requests the claim objections be withdrawn.

The specification was objected due to informalities related to the above claim objections. The specification has been amended to address informalities, the above claim objections, and minor typographical errors. Applicant respectfully requests the specification objection be withdrawn.

Claims 1-11, 13, and 23-25 were rejected under 35 U.S.C. § 102(b) as being anticipated by J.H. HUNT and R.B. HOLMES, *Observation of Optical response of Avalanche Photodiodes at Photon-Counting Light Levels*, Journal, May 30, 1994, 3pgs., Appl. Phys. Lett. 64 (22) [hereinafter referred to as "Hunt"].

Independent Claims 1, 23, and 25 are amended to recite "an InGaAsP photodiode" from dependent claim 12, which is neither taught nor suggested by the *Hunt* reference. Since not all claimed elements are taught by the cited reference, Applicant submits that Claims 1, 23, and 25 patentably distinguish over the *Hunt* reference and that corresponding dependent Claims 2-11, 13, and 24 are also distinguishable for at least the same reasons. Therefore, Applicants respectfully

request that the rejection under 35 U.S.C. § 102(b) of Claims 1-11, 13 and 23-25 be withdrawn.

Claims 12 and 14-22 were rejected under 35 U.S.C. § 103(a) as being obvious over *Hunt* in view of U.S. Patent No. 6,720,588 to *Vickers*. Applicant respectfully traverses this rejection in its entirety.

Vickers teaches a particular construction for an avalanche photodiode (APD) having a doped InGaAsP layer where the custom APD is finely tuned for use in detecting single photons by capitalizing on the avalanche effect to generate a magnified current in response to the detected photon (*Vickers* col. 3 lines 28-35 and col. lines 2-14). *Vickers* teaches the custom APD that is finely tuned to have a ratio of hole to electron ionization constants, a k value, that is approximately equal to one (*Vickers* col. 3 lines 36-47, col. 5 lines 36-41), in contrast to the single photon detection prior art which indicates a lower k value may be more beneficial (*Vickers* col. 3 lines 30-35). The custom APD taught by *Vickers* may be used as a detector element in a photon counting apparatus used in examining semiconductor devices, for example (*Vickers* col. 4 lines 56-58).

Applicant respectfully submits that the custom APD taught by *Vickers* is merely a detector element for detecting the emission of photons from a device under test (DUT), and that *Vickers* does not teach a first and a second source of photons

incident upon the APD, a photorefractive response, nor capturing light reflected by the APD. Furthermore, *Vickers* does not teach the combination as suggested, does not suggest such an application for the custom APD, does not teach the problems addressed by the present invention, does not teach the source of these problems, and does not teach the use of an InGaAsP photodiode to address these problems. Additionally, *Vickers* does not teach inducing modulation of the refractive index of the photodiode material. For at least these reasons, Applicant submits there is no basis for combining the references as suggested.

Further, an aspect of the *Vickers* custom APD teaches away from combination with the cited reference and use as claimed in the present invention, since *Vickers* teaches the frequency response is low for the custom APD detector having a k value near one as intended (*Vickers* col. 6 lines 10-14 and Figure 2b). In contrast, the present disclosure teaches converting an input optical signal at a first wavelength to an output optical signal at a second wavelength in time ranges on the order of 1 nanosecond (Specification para. [0030] lines 10-13). Hence, a person of ordinary skill in the relevant art would not be led to combine the references as suggested since the frequency response is low for the *Vickers* APD with k value near 1. Instead, a person of ordinary skill in the relevant

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art would understand *Vickers* teaches away from such a combination.

Therefore, Applicant respectfully submits that a prima facie case for obviousness is not made, and that even if the references are combined as suggested, they still do not teach all the claimed elements of the present invention. The uncombinable aspects of the *Vickers* disclosure do not remedy the deficiencies of the *Hunt* reference to teach all the elements of the presently claimed invention. Thus, Applicants respectfully submit that Claims 14 and 22 are distinguishable over the cited references in any combination, and the corresponding dependent Claims 15-21 are also distinguishable for at least the same reasons. Since claim 12 is canceled, Applicant respectfully requests that the rejection under 35 U.S.C. § 103(a) of Claims 12 and 14-22 be withdrawn.

Accordingly, Applicant respectfully submits that Claims 1-11 and 13-25 are in proper form for allowance. Reconsideration and withdrawal of the objections and rejections are respectfully requested and a timely Notice of Allowance is solicited.

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If there are any questions regarding any aspect of the application, please call the undersigned at (949) 752-7040.

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 December 19, 2005
Tina Kavanaugh

Respectfully submitted,



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